Technical Disclosure: Apparatus for Counter-Rotating Magnetic Field Induction

Descriptive Title: Apparatus and Method to Induce Current from a Virtual Rotating Magnetic Field Counter-Rotating to the Physical Rotor Mass

Technical Field: Electromechanical Energy Conversion and Advanced Electric Motor/Generator Design

Defensive Purpose

This document is intended as a defensive publication to establish prior art, placing this innovation in the public domain to prevent future patent claims by any party. The author explicitly dedicates all described concepts, methods, and embodiments to the public domain, allowing unrestricted use, reproduction, and modification by anyone.

Note on External Power

All embodiments assume a separate motor or mechanical drive rotates the shaft. The “brushed embodiment” additionally requires a DC input to the brushes.

The Problem Solved

In conventional synchronous and asynchronous electric machines (motors and generators), induced current generates a reaction torque (or load torque), commonly called Counter-Electromotive Force (CEMF), which opposes rotor rotation. This reduces machine efficiency and limits the maximum power-to-torque ratio.

This invention establishes a net positive relative rotational velocity between the magnetic field and the physical rotor mass, fundamentally altering magnetic interactions to eliminate or significantly reduce the conventional counter-torque.

Virtual Rotation

Many have attempted to induce current using virtual magnetic rotation, where no physical rotor exists for the CEMF to oppose. While some power can be generated, output is limited because the stator field has nothing to push against.

Analogy: To move forward, a person must push back against something. Likewise, when the rotor is stationary, the output magnetic field has nothing to push against to do “work.”

This invention allows the output stator to use its own CEMF to perform work on the rotor, producing real usable current.

Detailed Description of Apparatus and Methods

Embodiment 1: Geared Brush/Commutator Method

Rotor/Armature: Standard DC motor armature with a commutator mounted on the main shaft (RPM_shaft).

Brush Assembly: Brushes, normally stationary, are mounted on a separate axle or on a beaing on the same axle and mechanically geared to rotate in the opposite direction of the shaft (RPM_brush).

Field Generation: Applying DC voltage through the rotating brushes produces a magnetic field in the armature coils. Because the brushes rotate, the magnetic field now rotates in space relative to the stationary frame.

Relative Rotation:

RPM_field = RPM_brush - RPM_shaft

1:1 gearing example: Brushes rotate opposite the shaft at the same speed net field rotation = 0 (stationary in space)

2:1 example: Brushes rotate faster than the shaft net field rotation ≠ 0, producing a virtual counter-rotating field

Usable Output: The resulting field induces AC current in a stationary stator winding concentric to the armature.

Note: The net field rotation speed must exceed the shaft speed in the opposite direction to create a high-velocity virtual field capable of inducing substantial current.

Embodiment 2: Coupled Generator Method (Two-Armature System)

Common Shaft: Two armatures mounted on one shaft: Armature 1 (AC Generator) and Armature 2 (Main Inducer). See attached image.

Armature 1 (AC Generator): Four-pole winding: two isolated coils separated by 90 degrees to produce two-phase AC output with 90-degree phase shift. Mounted in a stationary 4-pole magnetic field (permanent magnets or field coils).

AC frequency = 2 × RPM_shaft.

Armature 2 (Main Inducer): Two-pole winding: two isolated coils positioned 90 degrees apart (quadrature). Driven directly by Armature 1 output.

Air Gap: High-reluctance separation prevents magnetic field superposition between armatures.

Direction Control: Phase wires are configured (by swapping one phase) to rotate the magnetic field opposite to the shaft rotation.

Relative Rotation and Field Speed: Field in Armature 2 rotates opposite to shaft.

Observed from stationary stator:

RPM_net_field = 2 × RPM_shaft - RPM_shaft = RPM_shaft

(producing a counter-rotating magnetic field without reaction torque opposing the shaft).

Usable Output: The virtual counter-rotating field induces current in a stationary output stator winding surrounding Armature 2.

CEMF Directing: The CEMF now contributes to rotor motion rather than opposing it, allowing efficient energy conversion.

Other Polyphase or Solid-State Variations

Equivalent methods may use electronic or polyphase excitation to generate counter-rotating magnetic fields without mechanical gearing. This section is included to defensively cover the concept; the goal is to place all such counter-rotating field methods in the public domain, not to teach replication using alternative methods.

Key Advantages

Elimination of CEMF Opposition: Counter-rotating field avoids traditional back-torque, allowing efficient energy conversion.

Enhanced Induction: High net field speed increases instantaneous induction and power density.

Novel Research Platform: Unique setup for studying non-conventional magnetic interactions and electromechanical phenomena.

Public Domain Declaration

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